

West Nile Virus In Arizona

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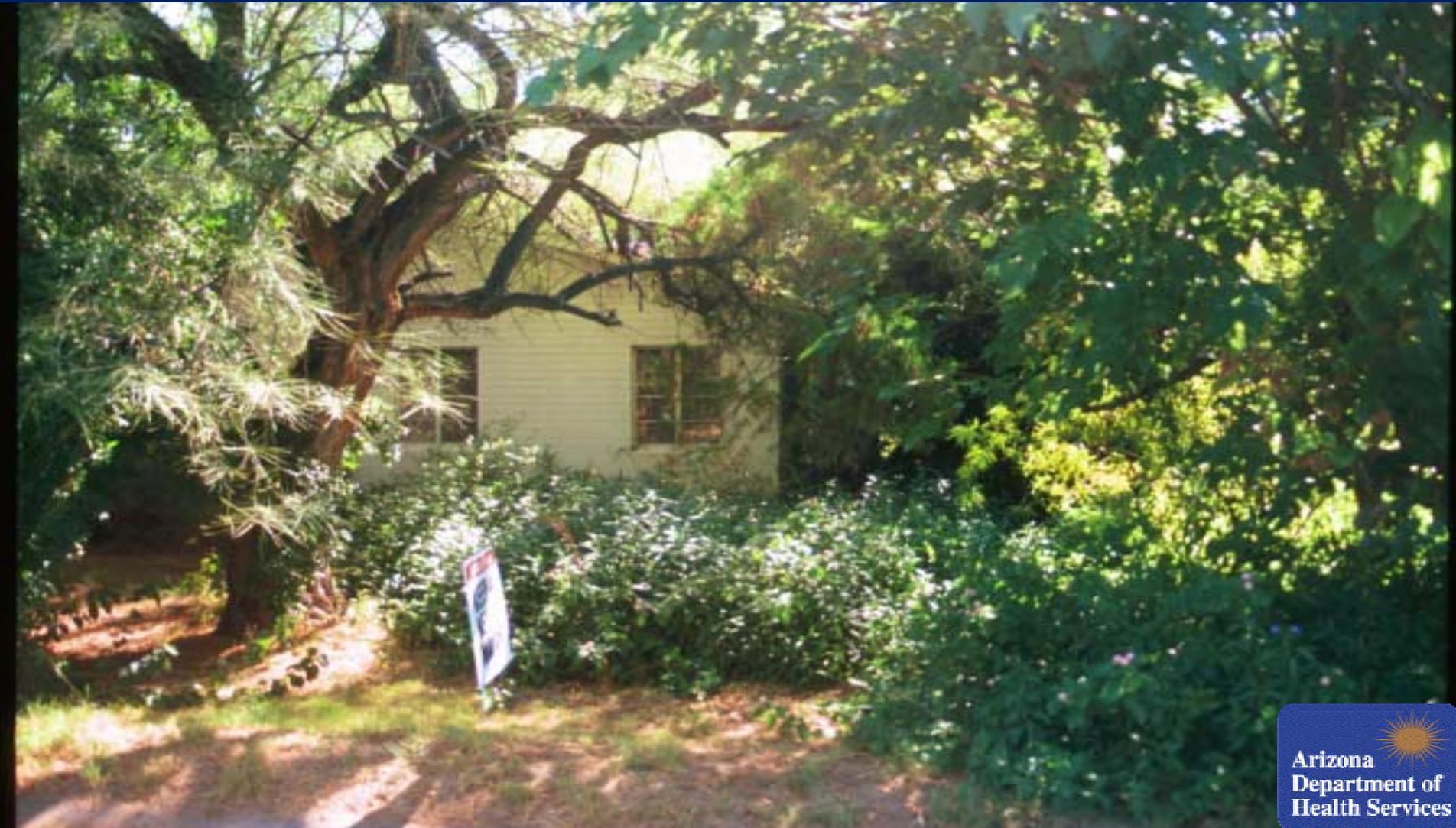
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WNV Outbreak Potential

- *Culex tarsalis* and *Cx. quinq* = common
- Certain bird reservoirs = common
- Long arbovirus transmission season
- Susceptible human population
- SLE = seasonal occurrence in many areas
- Effects of urbanization –“tropicalization”
- Thousands of **green** swimming pools



Got Desert ?



How about a refreshing dip?



WNV Surveillance in AZ

- Human case F/U
- Mosquito pools
- Dead bird testing
- Equine case F/U
- Sentinel chickens
- Other animals



Human Case Surveillance

- WNV is reportable by MDs and Labs
- Enhanced passive surveillance
- Switch to active surveillance w/ WNV+
- AZ State Lab - IgM ELISA: WNV & SLE
- Priority testing - neuroinvasive &/or hosp.
- Confirmation back-up by CDC
- Validated commercial lab + results during the first two months

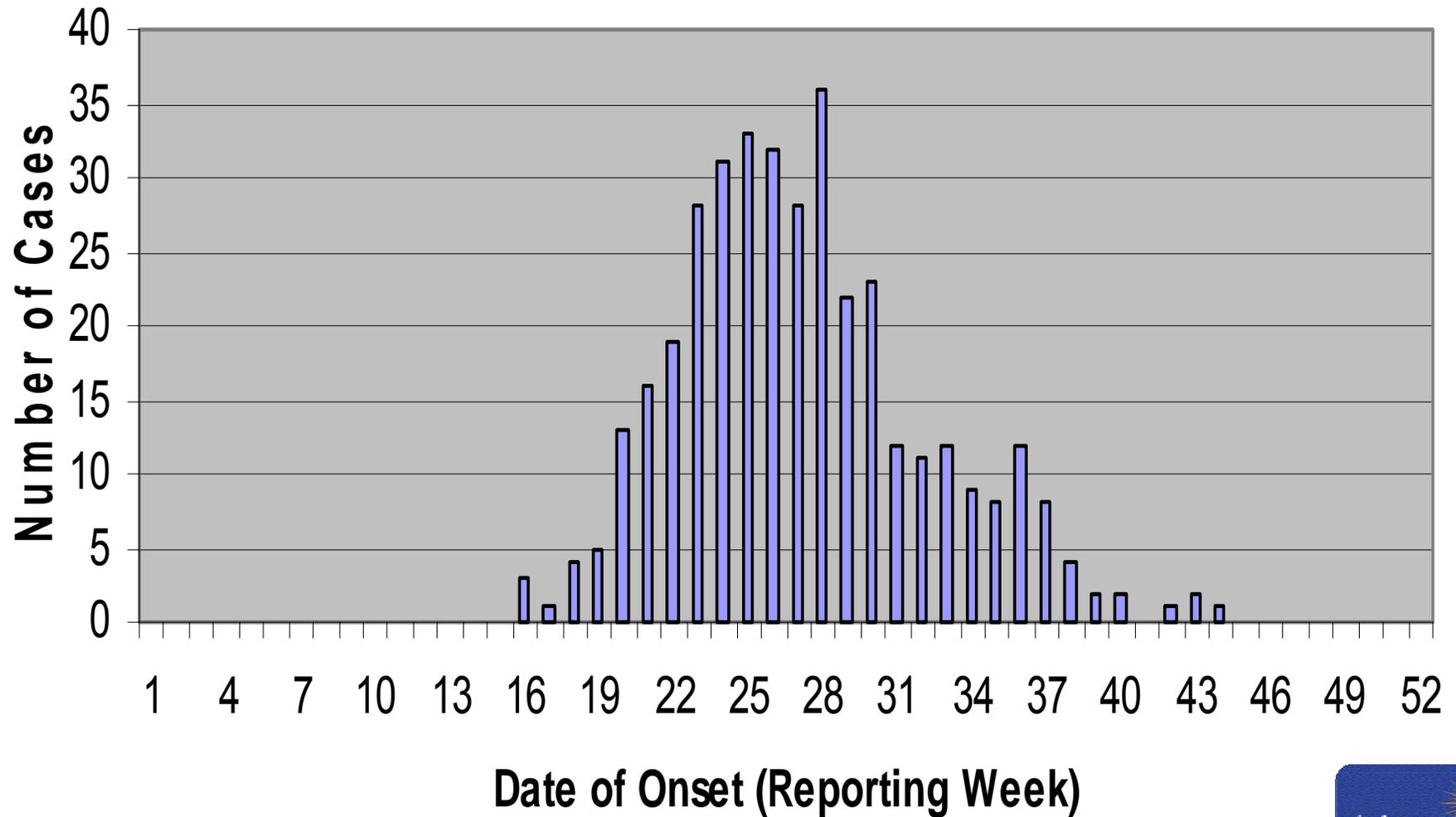
WNV Human Cases 2004

- Total # cases = 391 Fatal = 15
- Age range: 1 month – 98 years, Med.=51
- Clinical presentation:
 - ▶ Meningitis: 105 (26.9%)
 - ▶ Encephalitis: 109 (27.9%)
 - ▶ WNV Fever: 160 (40.9%)
 - ▶ AFP: 2 (0.5%)
 - ▶ Unknown: 15 (3.8%)

Arbovirus Cases 2004

- Total # neuro invasive cases = 214
- Est. # clinical WNV infections: 4,000+
- Surveillance detected ~ 10% clinical cases
- Est. # asymptomatic infections: 17,000+
- SLE: 4 (Maricopa – 3, Mohave – 1)

Epi Curve: Human WNV Cases in Arizona, 2004



WNV Cases by County / Rate

COUNTY	Population	#Cases (fatal)	Rate/100,000
Apache	69,243	5	7.25
Cochise	117,755	1	0.85
Coconino	116,320	0	0.00
Gila	51,335	1	1.95
Graham	33,489	4	12.00
Greenlee	8,547	0	0.00
LaPaz	19,715	0	0.00
Maricopa	3,072,149	355 (13)	11.56

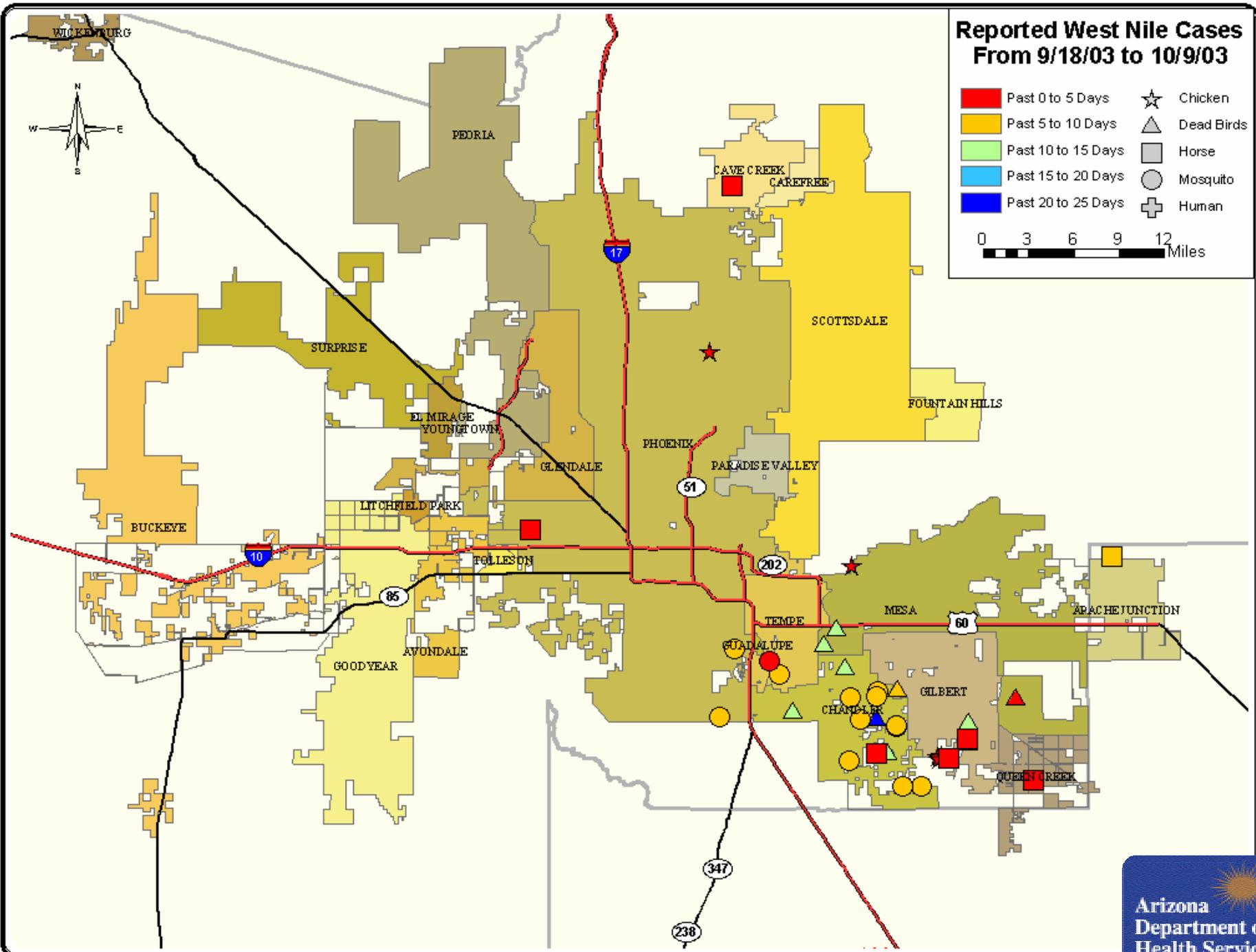
WNV Cases by County/Rate (Cont).

County	Population	#Cases (fatal)	Rate/100,000
Mohave	155,032	6	3.87
Navajo	97,470	1 (1)	1.02
Pima	843,746	7 (1)	0.83
Pinal	179,727	9	5.00
Santa Cruz	38,381	0	0.00
Yavapai	167,517	1	0.60
Yuma	160,026	1*	0.63
State Total	5,130,452	391	7.62

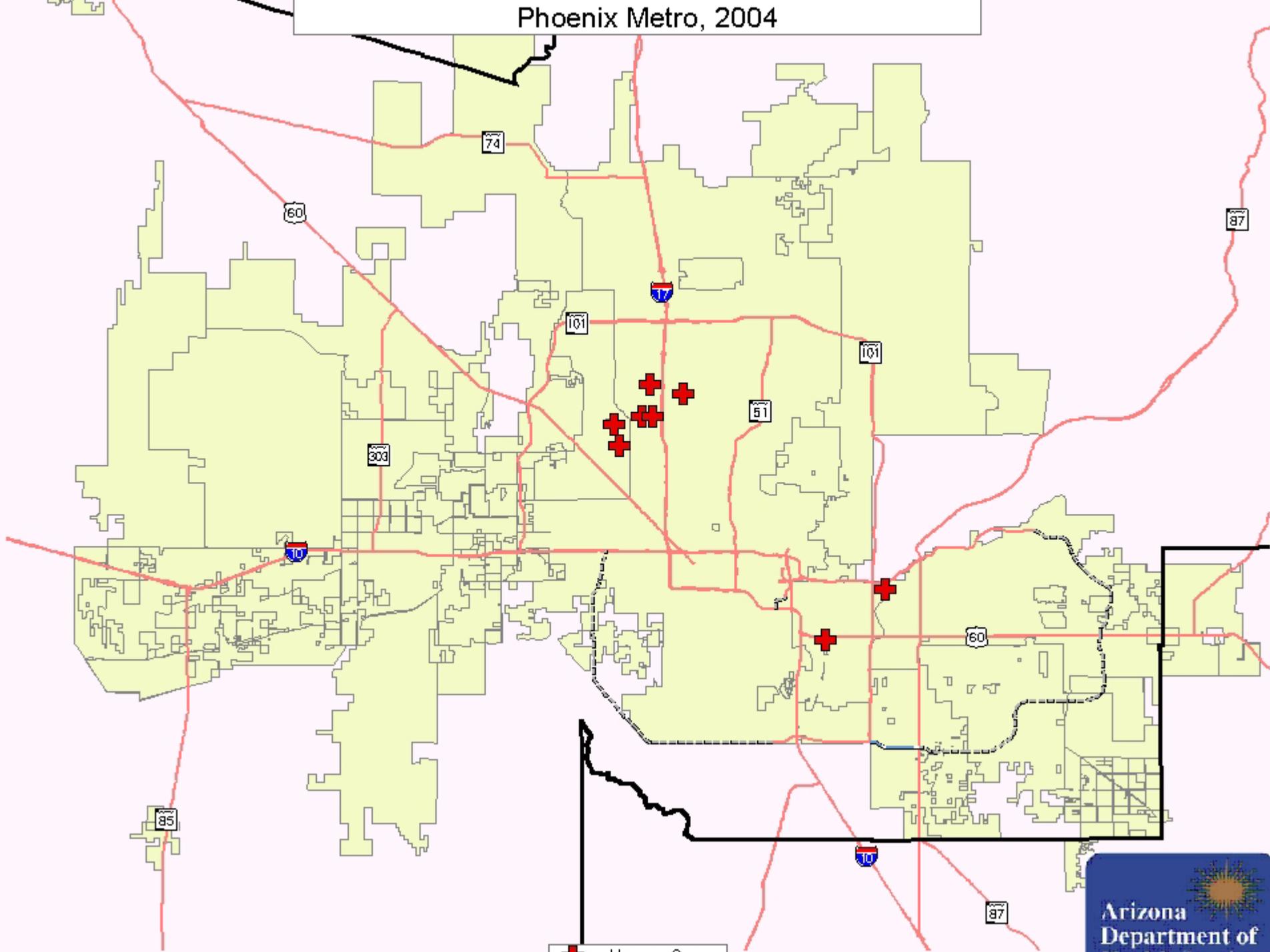
Reported West Nile Cases From 9/18/03 to 10/9/03

	Past 0 to 5 Days		Chicken
	Past 5 to 10 Days		Dead Birds
	Past 10 to 15 Days		Horse
	Past 15 to 20 Days		Mosquito
	Past 20 to 25 Days		Human

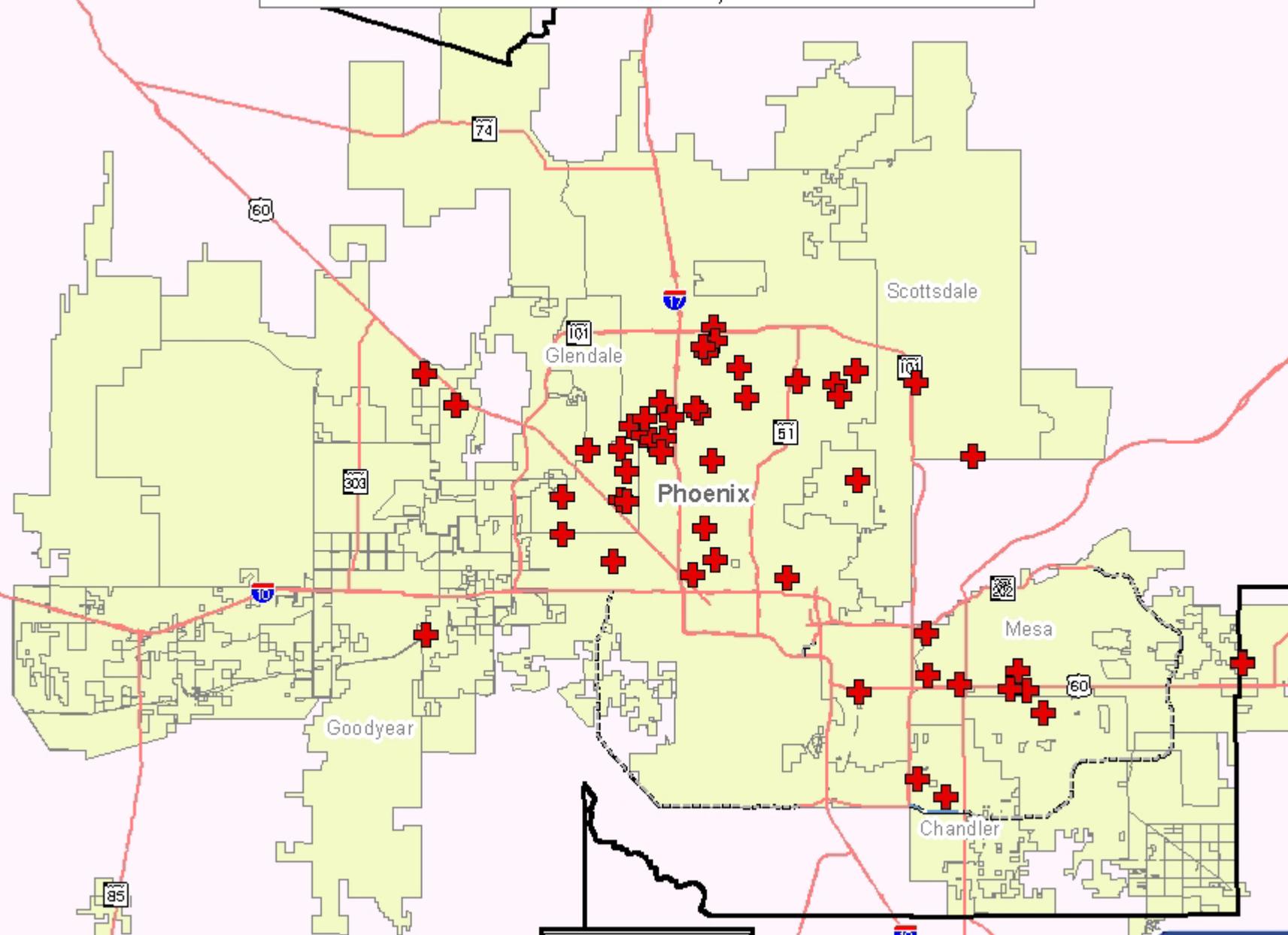
0 3 6 9 12 Miles



Phoenix Metro, 2004

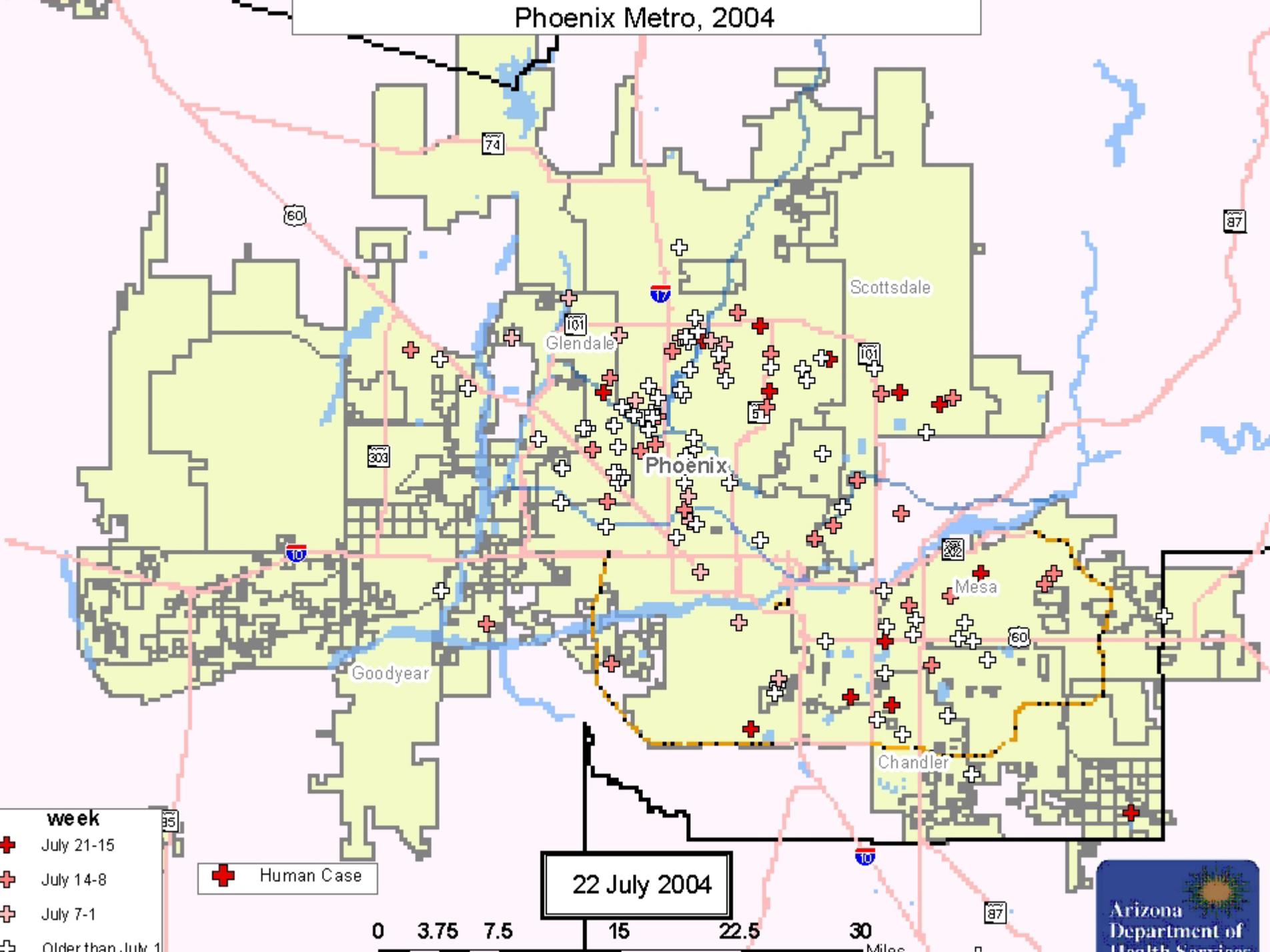


Phoenix Metro, 2004



8 July 2004

Phoenix Metro, 2004



- week**
- July 21-15
 - July 14-8
 - July 7-1
 - Older than July 1

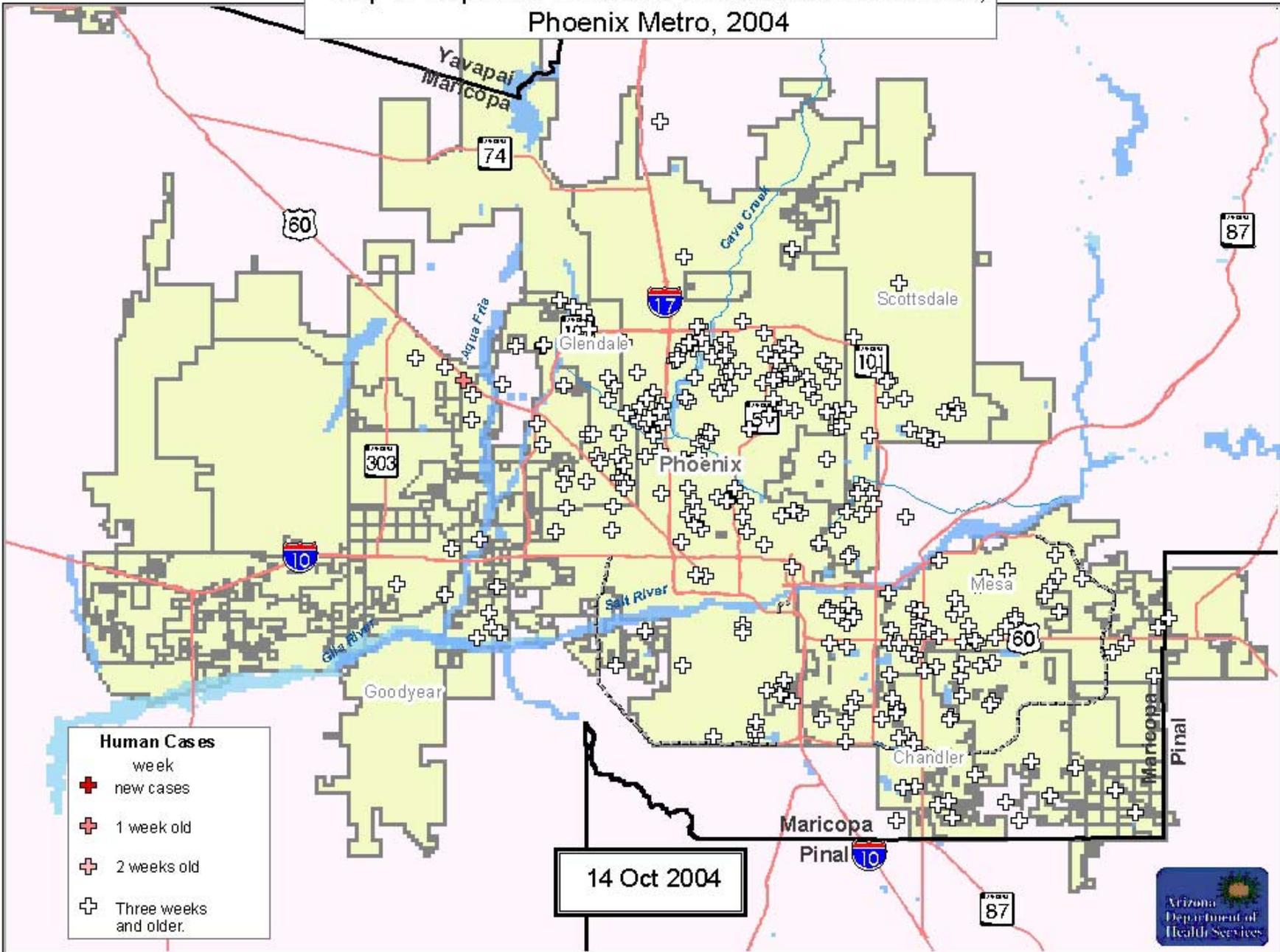
 Human Case

22 July 2004

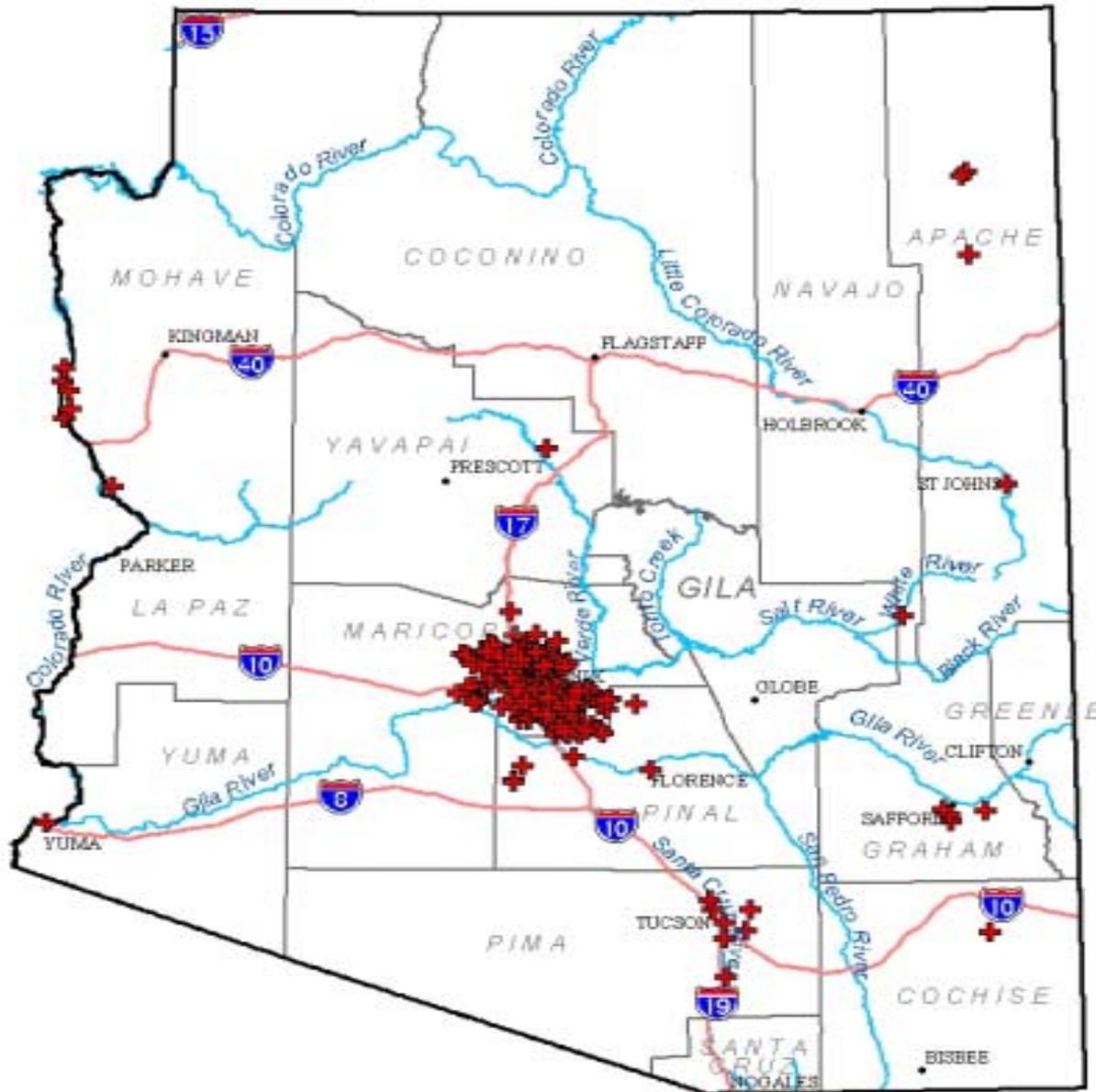
0 3.75 7.5 15 22.5 30 Miles



Map of Reported West Nile Virus Cases in Humans, Phoenix Metro, 2004



Map of Reported West Nile Virus Cases in Humans, Arizona, 2004



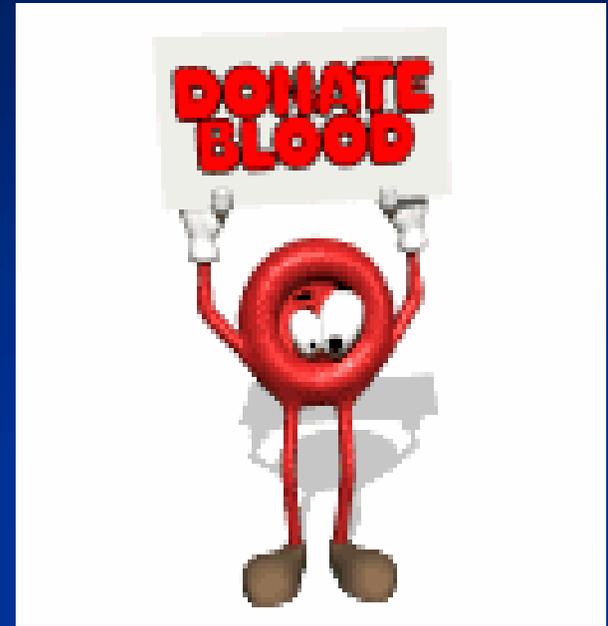
- County Seat
- + Human WNV

29 Oct 2004



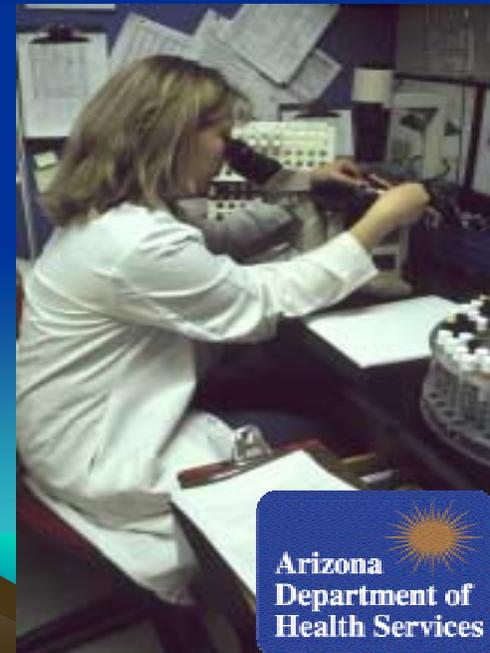
Viremic Blood Donors

- Viremic donors: Total = 36
- Viremic donors w/ sx: 24
- Viremic donors no sx: 12
- One case of TAT - fatal
- WNV+ organ donor: 1



Mosquito Pool Surveillance

- Testing performed by:
 - Arizona State Health Lab - PCR ~ 3,100 pools
 - Yuma Co. Pest Abatement Dist. – RAMP ~ 280 pools
 - Aquatic Consulting & Testing – RAMP ~ 950 pools
 - U.S. Army – CHPPM – PCR ~ 140 pools
- Total pools tested ~ 4,470
- 12 species / 6 genera
- WNV + = 250 pools (5.6%)



WNV+ Mosquito Pools / County

- Apache8
- Cochise.....6
- Coconino....0
- Gila.....1
- Graham.....6
- Greenlee.....0
- La Paz14
- Maricopa...101
- Mohave5
- Navajo10
- Pima.....29
- Pinal.....9
- Santa Cruz ...0
- Yavapai.....16
- Yuma43

WNV+ Mosquito Species

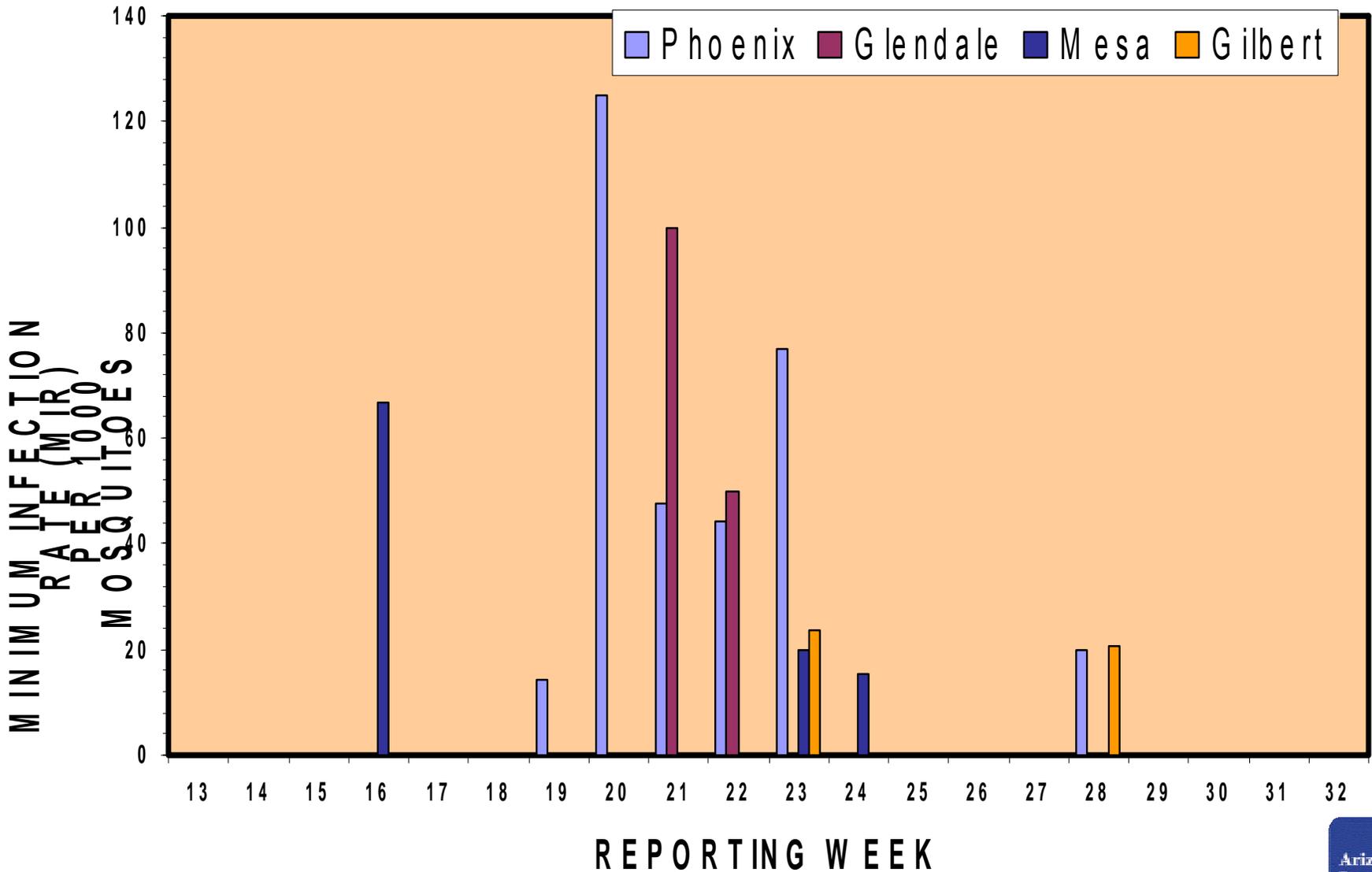
- Culex tarsalis157
- Culex quinquefasciatus73
- Culex erythrothorax.....4
- Culex sp.12
- Psorophora columbaie.....2
- Ochlerotatus nigromaculis...1

“Ms. Skeeter”

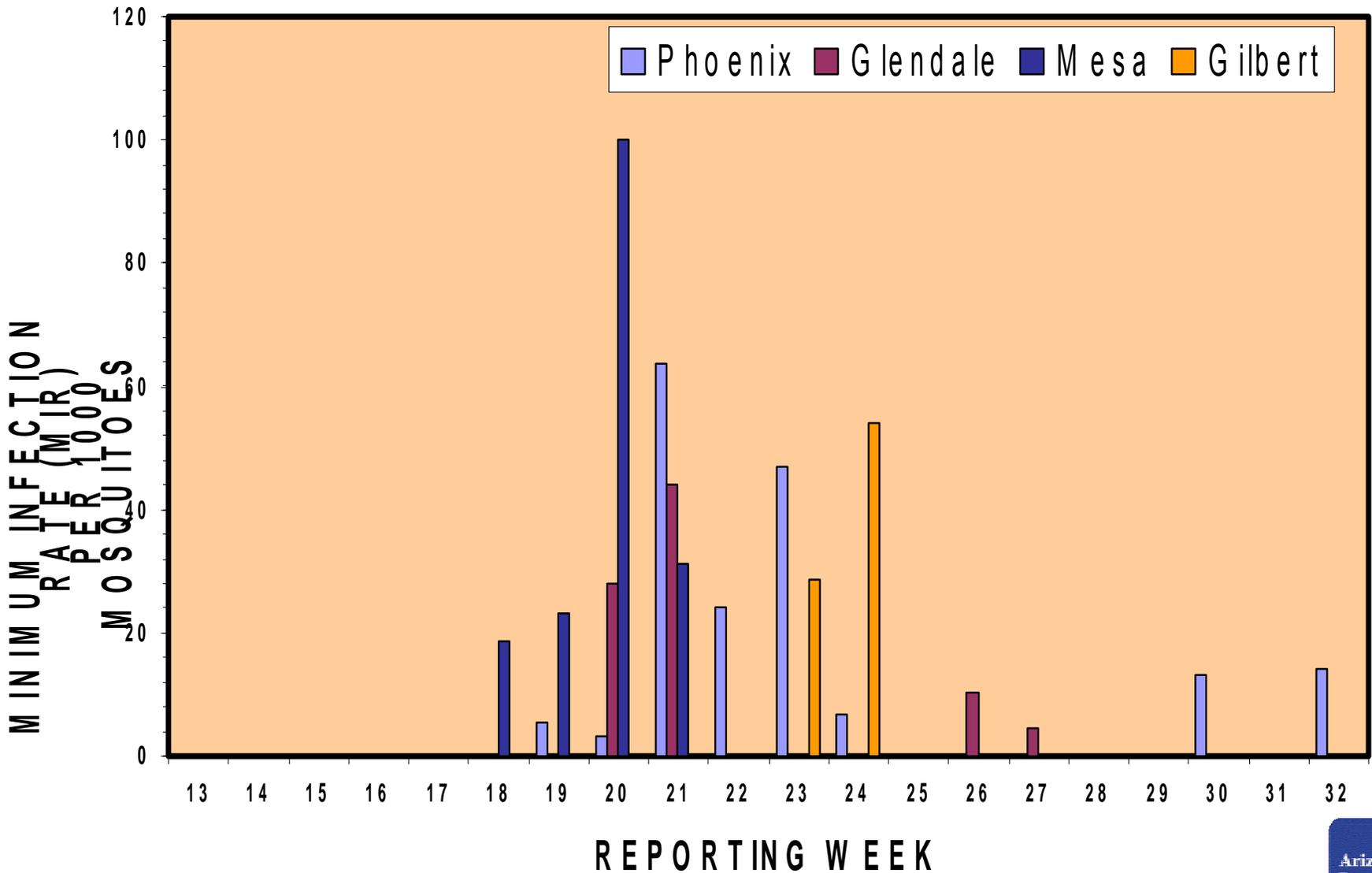
Apache County
Fight-the-Bite
Mascot



Maricopa County, Arizona WNV, 2004
Culex tarsalis

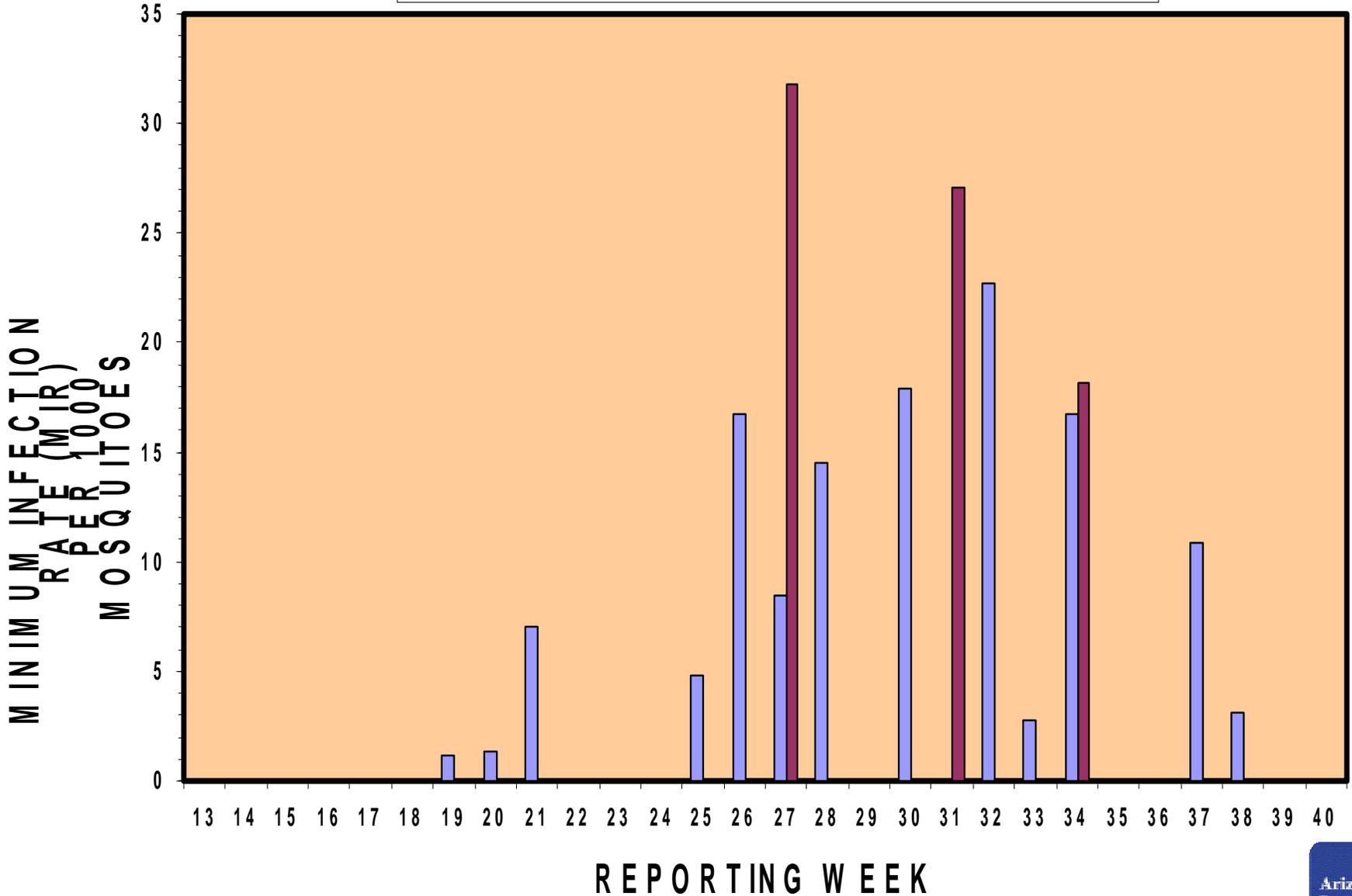


Maricopa County, Arizona WNV, 2004
Culex quinquefasciatus



Yuma, Arizona W NV, 2004

■ *Culex tarsalis* ■ *Culex quinquefasciatus*



Dead Bird Surveillance

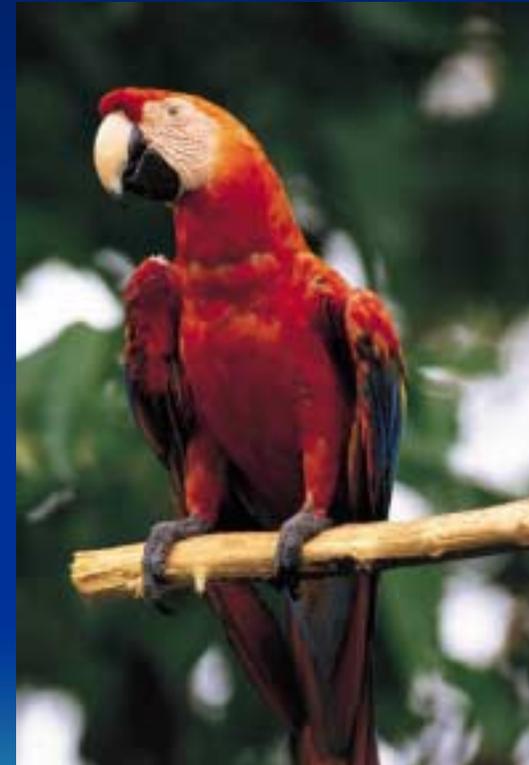
- Testing performed by the UA-Veterinary Diagnostic Laboratory, Tucson
- Tests: IHC, PCR, and RAMP assay
- All bird species were accepted so long as they were “fresh”
- Approx. 730 birds were tested in 2004
- 98 birds (13.4%) were WNV+

Wild Birds - WNV+

- Sparrows30
- Kestrels.....9
- Scrub Jays.....8
- House Finches...5
- Ravens.....4
- Cactus Wrens.....3
- Burrowing Owls...3
- Great Horned2
- Blk Crown Heron...2
- Crows.....2
- Doves.....2
- Thrush.....2
- Elf Owl.....1
- Golden Eagle...1
- Redtail Hawk....1
- Merlin.....1
- Quail.....1

Pet/Exotic Birds – WNV+

- Canaries.....5
- Gould Finches....3
- Lorikeets.....2
- Amazon Parrot...1
- Cockatiel.....1
- Grasskeet.....1
- Mynah.....1
- Sun Conure.....1



WNV+ Birds by County

- Apache.....2
- Cochise.....2
- Coconino.....3
- Gila.....0
- Graham.....3
- Greenlee.....0
- La Paz.....1
- Maricopa....52
- Mohave.....1
- Navajo.....5
- Pima.....17
- Pinal.....1
- Santa Cruz....1
- Yavapai.....10
- Yuma.....0

Dead Bird Surveillance

- Dead bird testing was of limited surveillance value in AZ due to sparse populations of Corvids
- Dead sparrows were best WNV indicators
- Scrub jays were good indicators in certain northern counties
- Human cases were reported before +birds

Equine Case Surveillance

- Horse bloods were tested by UA-VDL
- Test = IgM ELISA, IHC & PCR on Tissues
- Approx. 330 horses were tested
- 109 (33%) horses were WNV+



Equine Cases by County

- Apache10
- Cochise.....1
- Coconino.....6
- Gila.....2
- Graham.....2
- Greenlee.....0
- La Paz.....0
- Maricopa.....55
- Mohave.....1
- Navajo.....5
- Pima.....13
- Pinal.....7
- Santa Cruz.....0
- Yavapai.....7
- Yuma.....0

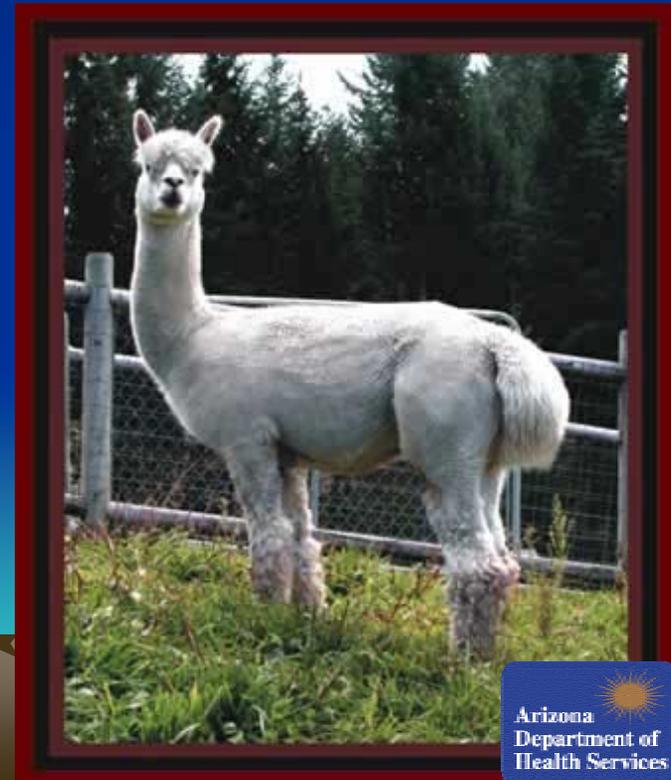
Sentinel Chicken Surveillance

- 19 flocks in 8 counties
- 6-10 birds / flock
- bled every 2 weeks
- IgG IFA* – AZ State Lab
- 50 chickens seroconv.
in 12 flocks / 5 counties

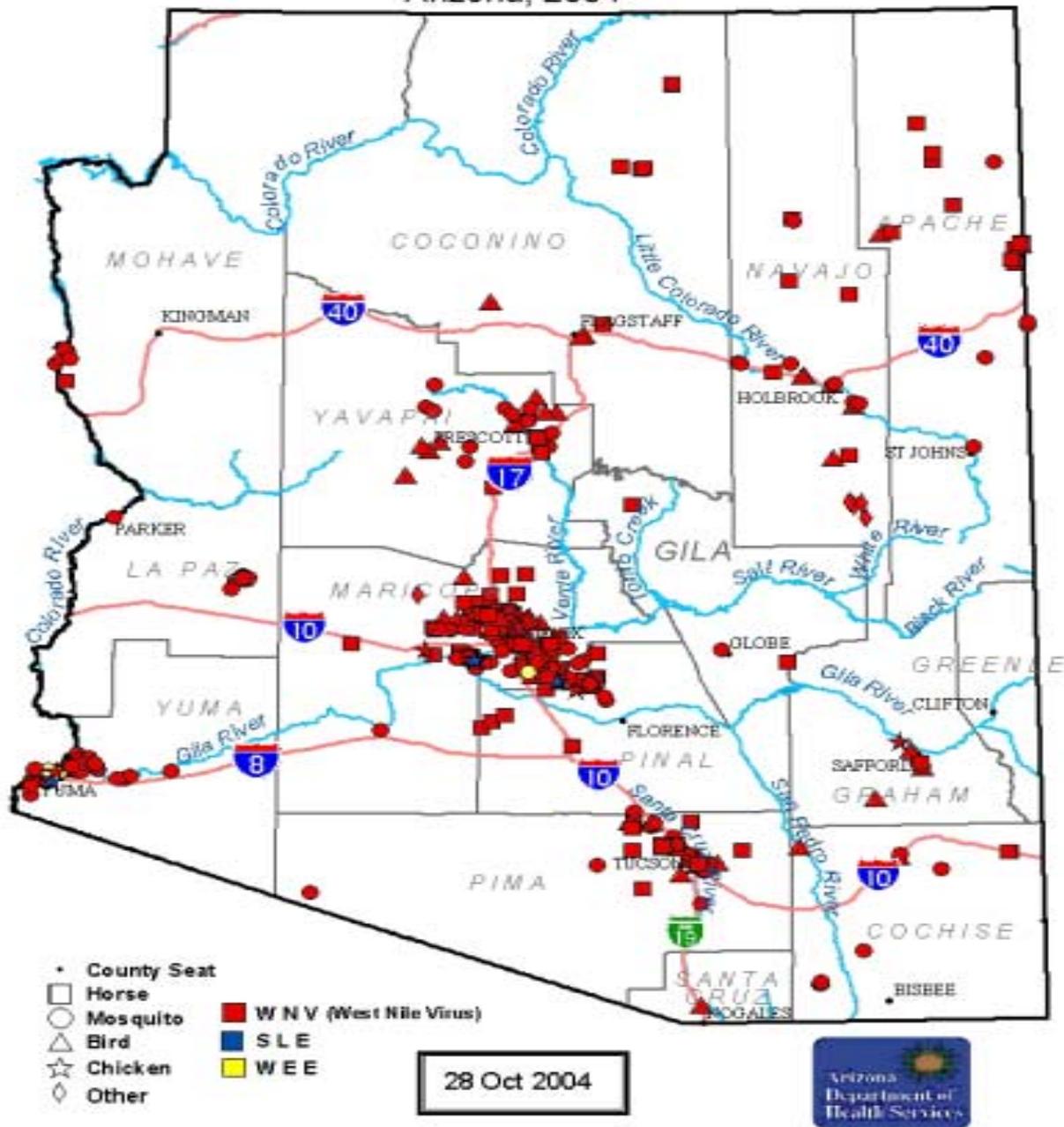


Other Animal Surveillance

- UA-VDL: IHC, PCR
- 21 animals tested: 12 sp. (5 wild, 7 exotic)
- 5 animals tested WNV+
- 4 tree squirrels & 1 alpaca



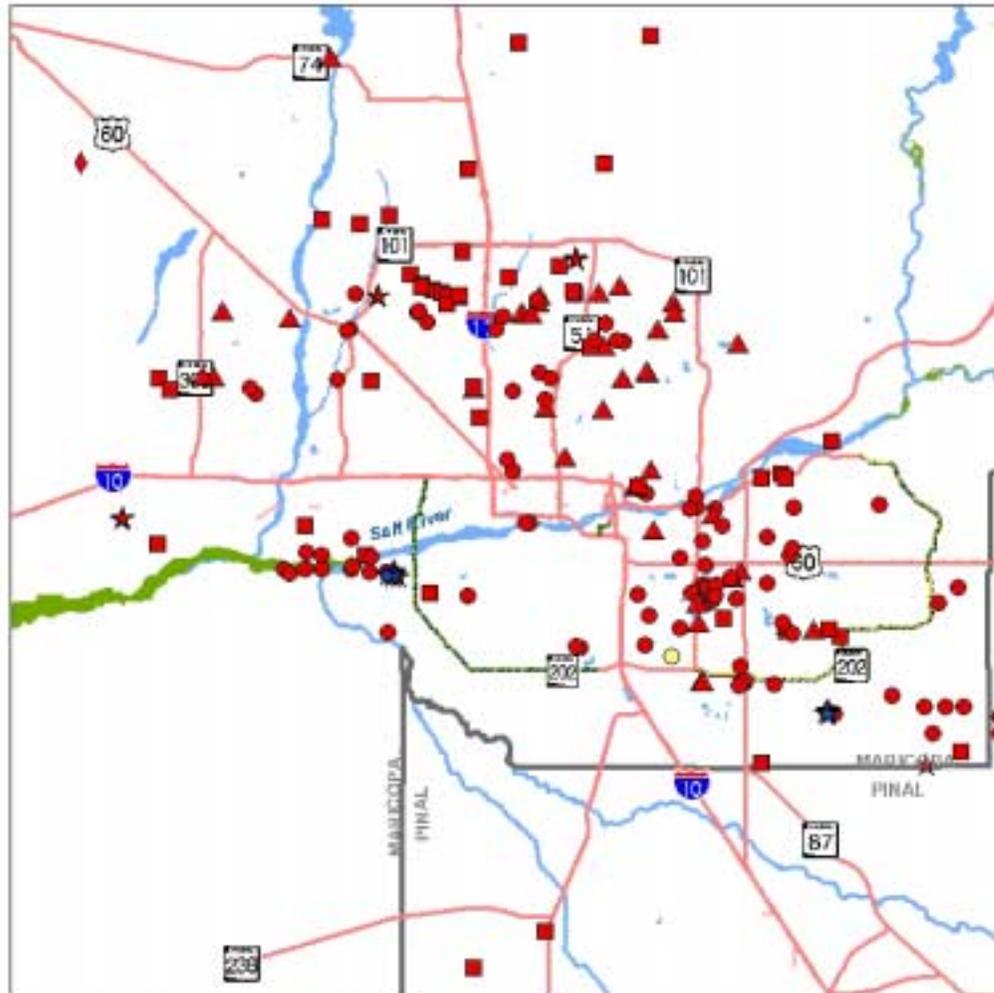
Map of Arbovirus Surveillance Indicators, Arizona, 2004



28 Oct 2004



Map of Arbovirus Surveillance Indicators, Phoenix metro, 2004



- County Seat
- Horse
- Mosquito
- △ Bird
- ☆ Chicken
- ◇ Other
- WNV (West Nile Virus)
- SLE
- WEE

28 Oct 2004



Lessons & Conclusion, Part 1

- Don't make predictions!
- Start surveillance earlier (March)
- Mosquito pool surveillance = best overall
- Dramatic WNV outbreaks can occur even when vector numbers are low
- Dead bird surveillance does not work well where Corvid species are uncommon

Lessons & Conclusions, Part 2

- Absence of Corvid bird reservoirs does not prevent WNV outbreaks
- Blood screening - start NAT testing on individual bloods earlier
- Don't use IgM assay for testing chicken bloods (IgM is short-lived)

Acknowledgments / Thanks!

- Arizona Dept. Health
 - State Health Lab
 - Other Epi staff
 - Bioterrorism staff
 - Vector/Zoonotic staff
- County Health Depts
- Indian Health Service
- Indian Tribes
- CDC – Ft. Collins
- Yuma Co. Pest Abate. Dist.
- UA Vet. Diag. Lab
- Aquatic Consulting
- US Army – CHPPM
- Air Force
- Blood Systems
- Univ. of Arizona
- Chinle Veterinary Clinic

